11I(;11 RESOLUTION UV SPECTROSCOPY FOR SOLAR SYSTEM EXPLORATION

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A new generation of high resolution UV imaging spacecraft (Polar, <;alilco,11S"1') arc studying the airglow and aurora of the 1 Earth and the Jovian planets. To keep pace with these technological improvements wc have developed a laboratory program to provide electron collision cross sections of the major molecular planetary gases (H_2, H, 0, N_2, CO_2, SO_2, O_2, 1 H_2O and CO). Molecular spectra under optically thin conditions have been measured with a high resolution ($\lambda/\Delta\lambda$ = 50000) UV spectrometer in tandem with an electron impact collision chamber. Synthetic spectral intensities and rotational line positions for 11> based on the J-dependent transition probabilities arc in good agree.mcmt with experimental intensities. A ncw high resolution UV mode] is being developed for modeling laboratory data. The model includes an accurate remeasurement of the Lyman band and Werner band cross sections. The kinetic energy distribution of H(2p) atoms resulting from electron impact dissociation of H_2 has been measured. 1 Electron impact dissociation of 112 is one of the major mechanisms leading to the observed wide profile of H Lα from Jupiter aurora by 11S'1'. Analysis of the deconvolved line profile of HI Lα reveals the existence of a narrow line peak (40 mÅ FWGHM) and a broad pedestal base (240 mÅ FWGI IM). Follow-on studies of dissociative excitation of SII 1 259Å, 01 1304Å emission from SO_2 and of NI 1 200Å, NII 1085~ from N_2 also indicate substantial kinetic energy release (1 - 10eV). Wc report a quantitative measurement of the predissociation fraction in the N_2 $c'_4{}^1\Sigma_u^+$ - , $X^1\Sigma_g^+$ (0,0) band to model N_2 EUV emission from Titan, Triton and the Earth. The most recent studies of the excitation cross section of the N_2 ($a\,{}^1\Pi g$) state will be discussed. Wc report the first study of HI Lα from atomic H in the extended energy range (10-2000 cV) where cross sections can be related to optical oscillator strengths. A small **(-So/O)** change in the cross section of the most abundant species at low energy (~50eV) is fundamental to all electron energy loss codes.

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6. Invited Talk

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10. Invited by Session Chair J. Slanger for Session SA03:Excited atoms. . .